# 86. Specific categorical Modelling System, second stage

Dr. Ruben Garcia Pedraza

Probabilidad Imposible: Specific categorical Modelling System, second stage

imposiblenever@gmail.com

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The second stage of the specific categorical Modelling System is the second stage of the first step of the third stage of the first phase, which means, the Modelling System in the auto-replication stage in Specific Artificial Intelligences for Artificial Research by Application.

The difference between Specific Artificial Intelligence by Deduction and Specific Artificial Intelligence by Application is intelligence by deduction as first stage is a database as a (specific, global, or particular) matrix, matching as second stage set of data with pure reasons (equations), in order to make, as third stage, decisions, in a process which consist of four steps: the modelling of the equations in order to make decisions, projecting the decisions, to be transformed into instructions, evaluating at the end the whole process.

In Artificial Research by Application, the first stage is a taxonomy or a list or database of categories, such as the taxonomy in mineralogy or a taxonomy in botany, as second stage matches real objects with the right category, for instance matching real minerals with the corresponding category in the taxonomy of mineralogy, and as third stage to make decisions the sequence of four steps, in order to make models of the real objects, upon the models to make decisions to be projected, to transform into instructions, assessing the whole process.

In essence, the application stage, as the first stage in by Deduction is a (specific, global, or particular) matrix, while the second stage in Application is a (specific, global, or particular) list of categories.

The second stage, as replication stage, is by Deduction the attributional process matching a set of data from the matrix to equations (pure reasons), while the second stage, by Application, is the attributional process matching real objects with categories.

As auto-replication stage or third stage, the decisions regarding to the real world, in by Deduction according to the attribution of set of data and pure reasons, the third stage is distributed in for steps: modelling the equations according to the data, making decisions to be projected, and transformed into instructions, assessing the whole process. While in by Application, according to the attribution of a real object to a category, it is necessary to make the model of the real object, to make decisions to be protected, and transform into instructions, assessing the whole process.

The third stage, then, either by Deduction or by Application, is divided into four steps, called each of them: Modelling System, Decisional System, Application System, Learning System. The main aim of the Modelling System is to model in order to make decisions, the main aim of the Decisional System is to gather the decisions to make projects to be transformed into instructions, the main aim of the Application System is to gather the instructions to be implemented by applications and robotic devices, and the main aim of the Learning System is the evaluation of the whole process starting from the evaluation of the matrix or the taxonomy in the first stage of the intelligence.

In order to make clear that when I am talking about the Modelling, Decisional, Application, Learning System, by Application, I will name these systems as categorical systems, calling them categorical Modelling System, categorical Decisional System, categorical Application System and categorical Learning System.

These systems within the third stage of any intelligence by application have as main goal to make real objective auto-replications, the improvement of the real world, along with these improvements of the real world, other improvements comprehended within the name of auto-replications are knowledge objective auto-replications, when the object to improve is the own knowledge within the intelligence, adding new categories or the deep artificial comprehension in by Application or improving the current ones, or adding or improving new factors or new rational hypothesis or models in by Deduction. Robotic subjective auto-replications occur when the object to improve is its own robotic system, mostly due to decisions made in the Learning System, and artificial psychological subjective auto-replications, as well, are mostly the responsibility of the Learning System.

In this post, I will develop the second stage of the Modelling System in Specific Artificial Intelligences for Artificial Research by Application in the first phase, which is why I call it the second stage of the specific categorical Modelling System.

The way in which in general the second stage of the specific categorical Modelling System will work is checking the conceptual/logical sets/vectors in which a real object has been included according to the place where it has been located in the conceptual scheme, as first stage of the categorical Modelling System, which in turn depends on the attribution made in the second stage by Application when matching the real object with the category within the list of categories in the first stage as application in by Application.

The first stage by Application consists only of the list or taxonomy of categories, understanding these categories as conceptual categories defined in quantitative terms, later on the second stage according to the measurements from real objects, the second stage by Application matches every real object with the right category matching the measurements from the real object and the quantitative description of the right category in the list or taxonomy of categories.

When doing the attribution, the measurements from an object meeting all the quantitative requirements of a category, this attribution is a full attribution, or having the possibility to match a real object with more than one category, the attribution of the object to that category with the higher percentage of attribution, being this attribution as well full attribution.

When trying to match a real object with a category, in the first stage by Application there is no category matching the measurements from the real object, at least in a critical similarity, level of similarity between object and category equal to or greater than a critical reason, then the measurements of the real object become the quantitative description of the new category, then it is said that this real object corresponds to a new category to be added to the list or taxonomy of categories, describing this new category with the sample of measurements taken from this new real object. This is a new attribution. For instance, if digging in another planet, moon, asteroid, a robot finds a mineral not matching with our current taxonomy in mineralogy, this new mineral will be considered a new discovery, and the quantitative description of this new mineral is the sample of measurements taken by the robot, adding this measurements as a new category within the list or taxonomy of categories

When a new attribution is not useful, for instance, matching a farmland with the right type of seeds to plant, in the current list or taxonomy of seeds suitable for a plantation, there are not any type of seeds able to reach the matching level, no full attribution between the chemical composition of the land and the weather in the area and the chemical composition of the land and weather suitable for the seeds within the current list or taxonomy of seeds, in this case the possibility to create a new category for this farmland is not very useful, because the purpose of this application is not to discover new types of farmlands, but how to increase the production of the existing farmland seeding the land with the most suitable seed according to the chemical composition of the land and the weather in the area. In this situation what is more useful is to say: not having reached the critical similarity level to match this land with the corresponding seeds, what it could be useful is to consider as utilitarian attribution (not full attribution, nor new attribution), the attribution of the seeds with the higher percentage of similarity with this land as the most suitable, although not having reached the matching point.

For this reason, within the Specific Artificial Intelligences for Artificial Research by Application, it is necessary to distinguish three different types of intelligences by Application:

- Heuristic Artificial Research by Application: as only heuristic intelligence its purpose is only to acquire new knowledge, the main purpose of an Heuristic Research by Application is to get new knowledge, for instance, in space exploration, a robot with a Specific Artificial Intelligence for Heuristic Artificial Research by Application for mineralogy, the analysis of the chemical composition of the geology of a planet, adding as new discoveries as new categories for the first stage as many new minerals in the taxonomy of minerals as new minerals could find in that planet. In a Heuristic Artificial Research by Application, when not matching no real object with any category in the application, automatically, the new real object is considered as a new category to be included in the application, being this attribution of the real object as a new category, a new attribution.

- Productive Artificial Research by Application: as only productive intelligence, its purpose is to analyse real objects, researching their quantitative qualities in order to match these real objects with the existing categories in the application. For instance, in a plantation, matching each farmland with the right seed to be planted in each farmland to increase the production, another example, in a delivery system, matching every package with the right category of package in the application, in order to process the delivery of this package, another example if a jet receives the instruction to fly to some

place, matching the place with the nearest airport according to the list of airports in the application. In productive Artificial Research by Application as its objective is productive, not heuristic, when a real object does not match fully with any category in the application, a new attribution is not really useful, when not matching a real object with any category in the application in Productive Artificial Research by Application, what is advisable is to make utilitarian attributions, matching as utilitarian attribution that real object with the category in the application with the highest similarity even not reaching the matching point.

- Mixed Artificial Research by Application: that intelligence by application with heuristic and productive aims, for instance, in space colonization, once the space exploration is ready for the colonization of a planet or a moon, setting for instance fully robotised factories ruled by Artificial Intelligence, a mineral exploitation in other planet or moon, not only should be able to make utilitarian attributions, for instance, how to exploit every single land, should be able to make new attributions when finding new minerals not existing yet in the taxonomy of minerals.

The distinction between full, new or utilitarian, attribution will play an important role in the second stage of the specific categorical Modelling System, once the real object, according to the full, new or utilitarian, attribution has been filed in the conceptual scheme as first stage in the specific categorical Modelling System, having passed the first categorical check.

As I explained in the last post, dedicated to the first stage in the specific categorical Modelling System, as soon the second stage by Application makes the (full, new or utilitarian) attribution to the real object, the second stage by Application will file the real object in the conceptual scheme as first stage of the specific categorical Modelling System.

The conceptual scheme as first stage of the categorical Modelling System is part of the deep artificial comprehension system, and the conceptual scheme is a scheme of conceptual categories (the same categories as listed in the taxonomy or list in the first stage by Application), with the difference that in the conceptual scheme the categories are related each other by vectors according to their logic relations, so every single relation of every category with any other category represent a vector, the total number of vectors of every category respect to the rest of categories is the total number of logic relations of

this category respect the rest of categories, and each single relation is a single vector, or every vector a single relation.

In every category are placed as many real objects as have been matched with this category in the second stage by application.

At the end, if in the first stage of by Application, the application consists of a list or taxonomy or database of conceptual categories, defining every category in quantitative terms, in the conceptual scheme as first stage of the categorical Modelling System, for every category in the scheme not only there is a quantitative description of this category, but the quantification of as many real objects have been attributed to this category or place in the scheme, and as many vectors or logic relations this place in the scheme or category has respect to the rest of categories or places in the conceptual scheme.

As first categorical check the first stage in the specific categorical Modelling System will ensure that per average there is some level of harmony, within a critical reason, within all the real objects placed in every category in the conceptual scheme, otherwise, if a real object is out of the margin of error, there is a real risk that the attribution is wrong.

The critical reason in the first categorical check in the conceptual scheme must be set up according of what kind of attributions the Application is able according to its purpose: heuristic (if not reaching the matching point a new real object becomes a new category, so a new attribution), productive (if not reaching the matching point, is necessary utilitarian attributions, so the margin of error must be as wide as to comprehend a flexible harmony to include utilitarian attributions), mixed (when the Application have both purposes, heuristic or productive, according to the aim of every research within the Application, to set up different critical reasons according to the main aim of every research, if the research is heuristic or productive).

The first categorical check, the only thing it is going to check, is the percentage of harmony (level of similarity) in the quantitative qualities of the real objects placed in every category in the conceptual scheme. The first categorical check will only compare that, per average and within the critical reason according to the purpose, heuristic, productive, mixed, there is harmony between the quantitative qualities of a recent real object placed in that category in the conceptual scheme, and the rest of real objects placed in that category in the conceptual scheme.

Once the first categorical check in the conceptual scheme has checked that and within the critical reason is acceptable to place a real object in a category within the conceptual scheme, the next stage of the categorical Modelling System is the second stage of the categorical Modelling Systems whose processes and procedures are oriented to make a categorical model.

The second stage of the categorical Modelling System will be responsible for the modelling of every real object according to what kind of attribution was made in the second stage by Application (full, new, utilitarian), and how it was placed in the conceptual scheme.

In order to make the categorical model of a real object in the second stage of the categorical Modelling System, the processes to do are:

- Once in the first stage of the categorical Modelling System, the first categorical check in the conceptual scheme approves that this is the right place in the conceptual scheme of a real object, then the second categorical check in the second stage of the categorical Modelling System will check that, within a margin of error, adapted to the purpose of this Application (heuristic, productive, mixed), every real object in every category, complies with the logical relations of the category where it has been placed respect to the rest of categories in the conceptual scheme. Here, the margin of error, or margin of possible number of vectors related to the attributed category but not within the real object, will depend on what kind of attribution was made, full, new or utilitarian.

- After the analysis of how many vectors within the category are found in the real object, according to the quantitative qualities of an object and the vectors met, to model a categorical model of the object as a virtual model made of the synthesis of the quantitative qualities of the object and the logic relations found. The categorical model of a farmland as the virtual model of how this farmland should look, according to quantitative qualities of this farmland and the qualities of the seed and the logical relations around this attribution in the conceptual scheme. Here, the third categorical check will ensure that the representation is correct according to the quantitative qualities of the object and the vectors in the conceptual scheme.

- Having ready the virtual model, as synthesis of the mathematical representation of the object and the category attributed, the location of the position of this virtual model in a virtual map, where the virtual map must represent as well the conceptual relations between the real objects and categories in every position or area within the map. The fourth categorical check must check that the position of the model in the map is right, and the conceptual relations in every position and real objects in the map are correct.

If the first stage of the categorical Modelling System consists of the conceptual scheme, the second stage of the categorical Modelling System consists of how to make a model locating the model in a map having as sources of information the quantitative qualities of the real object and the logic relations of its category within the conceptual scheme.

In general, the first and second stages of the Modelling System form the deep artificial comprehension, including the conceptual scheme, the conceptual sets, the conceptual model, and the conceptual map.

Once the deep artificial comprehension has been completed or updated, the completion or update of the first and second stages of the categorical Modelling System, the third stage of the Modelling System is the attribution of decisions according to the model on the map. For instance, in a plantation, the distribution of the sequence of decisions about how to plant and take care of the plantation, such as decisions about how to water the land, how to fertilise the land or if necessary, the use of pesticides. In an intelligent delivery system, according to the model of every package and the destiny of every package in the map, decisions about what means of transport, driverless car, drone, jet, or a combination of different means of transport, is more suitable for the delivery of every package.

But the third stage or decision stage, will depend firstly on how the real object was modelled and mapped in the second stage, modelling process in the second stage of the categorical Modelling System which starts with the analysis of the logic relations or conceptual sets within the real object according to where was placed in the conceptual scheme as first stage of the categorical Modelling System.

The analysis of the logical sets or conceptual sets within the real object according to the place where it has been filed in the conceptual scheme, is the analysis of, according to the attributional percentage in the second stage by Application, what type of attribution

was made, because depending on the level of similarity the real object will share more or less conceptual sets with the category attributed.

If the category is formed by a range of qualities described in quantitative terms, and by every quality the category has a certain number of vectors, the total number of vectors is equal to the addition of the total number of vectors of every quantitative quality, having in mind that the number of vectors for quality is irregular, some qualities have more vectors than others.

If the level of similarity in the attribution reaches 100%, in that case, the real object shares with the category all the qualities of the category, so the number of vectors in the real object is equal to the total of vectors in the category.

But if, even being a full attribution, having reached the matching level, level of similarity equal to or greater than the critical reason, the attribution is not 100%, for instance, if the matching level is set up at 95%, if a real object shares only the 95% of qualities of the category, this means that there is a 5% of qualities within the category not shared with that real object, what means that the number of vectors related to that 5% of difference, is a number of vectors not present in the real object, so not all the vectors of this category in the conceptual scheme are shared by this real object.

Because the number of vectors for quality is not regular, this means that not every quality has the same weight of vectors in the conceptual scheme, two different and non identical real objects, having at the same time 5% of error within the critical reason, so both have been accepted, accepting a 5% of error in the decision, even having both decisions the same margin of error, the weight of this error later on the conceptual scheme will be different, because if both objects are different and non identical, so both objects do not share the same qualities, and not sharing the same qualities have the same percentage of error, 5%, this means that the qualities comprehended in the margin of error in one of them are different to the qualities comprehended in the margin of error in the other, so the error structure in each object is different, so having different structure of error, the qualities within the error in one of them is not the same that the qualities of error in the other one, this means that the weight of vectors included in the margin of error in one of them is not the same than the weight of vectors included in the margin of error in the other one, what means that having both 5% of error, instead the weight of error in terms of number of vectors included in the weight of error is different, so having the same 5% of

error, one of them will have a much bigger weight of error in the conceptual scheme and the other one a less weight of error in the conceptual scheme.

For this reason, in the second stage is necessary a second categorical check checking what number of vectors shares every real object with the category, and if the weight is too high as to be a problem later on the model, to reject the attribution, in order to make a new or consider this attribution not a full attribution but an utilitarian attribution.

In a utilitarian attribution, the critical reason in the weight of error in the number of vectors of a real object within the category in the conceptual sets, according to the conceptual scheme, the critical reason must be wider, accepting a margin of error not so strict, or even the possibility to delete a critical reason, only consisting the second categorical check as that process to analyse what vectors are present in a real object to make later conceptual models.

In case of new attributions, in heuristic research, when not reaching the matching level a real object respect to any existing category, the quantitative qualities measured are the definition of this new category, setting in the conceptual scheme as many vectors as possible from every quality of this new category respect to any other quality of any other category in the conceptual scheme.

The main purpose of the second categorical check is to analyse how many vectors and what type of vectors, within the vectors in the conceptual scheme of the category attributed to a real object, are present in a real object added to that category in the conceptual scheme, criticizing the weight of vectors shared by this real object respect to the total number of vectors in the category in the conceptual scheme.

And once this criticiam is done, according to the results: types and numbers of vectors; the categorical model is the synthesis of the quantitative qualities of the real object and the vectors shared by this real object with the category in the conceptual scheme, understanding that a vector is a logical relation between a quality of this category and any other quality of any other category, having any quality of any category as many logical relations as possible, being the number of vectors for quality not constant, is variable.

The conceptual model as synthesis of the quantitative qualities of a real object and the logical relations of the qualities of this object respect to any other quality from any other object, is a virtual representation of the object, representing the object itself, according to the measurements, and the logic relations of its qualities respect to any other quality. The third categorical check must ensure that the conceptual model of the real object is as isomorphic as possible with respect to the quantitative qualities of the object and the number of vectors shared with the category.

The way to represent the virtual model is by making a model in scale, labelling in the virtual model any possible logical relation of any quality of the model with respect to any other possible quality of any other object. Ensuring the third categorical check that the scale used was correct, and the labels in the model are correct.

The virtual model of a farmland to seed should be the drawing of the farmland in scale, labelling in the drawing what type of seeds are going to be used to seed the land, and all the logic sets in common between the qualities shared between the land and the seed attributed and any other category in the conceptual scheme.

The virtual model of a package to be delivered is the drawing of the package in scale, labelling what means of transport has been attributed to deliver this package.

Once the virtual model is finished, the model is located on a conceptual map, labelling all the conceptual or logic relations that this model could have respect to any other model in that position or area, ensuring the fourth categorical check that the position chosen for that model in the map is correct, and the logical or conceptual relations found between this model and any other one in the same position or area is correct.

For instance, locating a farmland in the exact position in a conceptual map, labelling all possible logical or conceptual relations of this model with respect to any other model in that position or the area, making sure the fourth rational check that the position and logical relations are done correctly. In a delivery system, locating the model of the package in its current position, locating on the map the destination of the package, and labelling what means of transport that will participate in the delivery of that package from the origin to the destination. Ensuring the fourth categorical check that the positions and conceptual labels in the map are correct.

At some point, the inner organization of the second stage of the categorical Modelling System in: 1) analysis of the conceptual/logical sets/relations (vectors) within a real object according to the place of the category attributed in the conceptual scheme, 2) virtual model as synthesis of the quantitative qualities of the real object, measurements, in scale, labelling the model with vectors analysed before, 3) locating the virtual model in a virtual map; this inner organization based on three different processes: logic analysis, virtual model, virtual map; is a reminiscence of the three stages, but now as sub-stages within the second stage of the categorical Modelling System.

This means that the second stage of the categorical Modelling System is organised internally in three sub-tages, the first sub-stage logical analysis of conceptual sets as vectors, the second sub-stage the modelling process as synthesis of measurements in scale and the result of the analysis of logical sets, the third sub-stage locating the model in the map.

In short, the second stage of the categorical Modelling System consists of the logical analysis of the qualities of a real object, to make a model, and to locate on the map.

Once the model is located in the map having in mind the logical labels, the third stage of the categorical Modelling System will distribute the sequence of decisions, as real objective auto-replications, for instance in a plantation, how to carry out the seeding and the fertilize of the land, and if necessary the use of pesticides, or in a delivery system, all the decisions to deliver the packages.

Later on, the decisions will be filed in the database of decisions in the specific categorical Decisional System as the second step in the third stage of the Specific Artificial Intelligence by Application.

In general, the third stage by Application is not so different to the third stage by Deduction, the most important difference is that the origin of this process is not based on deduction, but the attribution of categories of real objects, which is the reason why all these processes are named categorical systems.

Rubén García Pedraza, 18 de Brumario del 2020, Londres

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